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Honorable Sanket J. Bulsara, U.S.M.J.
United States District Court
Eastern District of New York
225 Cadman Plaza East
Brooklyn, New York 11201

Re: *Biofer S.p.A. v. Vifor (International) AG*., No. 1:22-cv-02180-AMD-SJB (E.D.N.Y.)

Dear Judge Bulsara:

Plaintiff Biofer S.p.A. ("Biofer" or "Plaintiff") submits the following summary of relevant claim construction deposition testimony excerpts from Biofer's experts: (i) Dr. Allan S. Myerson, Ph.D., Professor of Chemical Engineering at Massachusetts Institute of Technology, regarding the term "pH between 7.0 and 9.0" (Ex. A); and (ii) Dr. Paul J. Chirik, Ph.D., Professor of Chemistry at Princeton University, regarding the term, "stoichiometric quantities." (Ex. B.)

I. Deposition of Allan S. Myerson, Ph.D. (July 27, 2023) – "pH between 7.0 and 9.0"

The deposition testimony of Dr. Myerson confirms and provides further support for Biofer's proposed construction of the disputed claim limitation, "pH between 7.0 and 9.0."

A. The Claim Language Does Not Support Reading in an Unrecited "Maintained" Limitation:

First, Dr. Myerson testified why a person of ordinary skill in the art ("POSA") would not read Vifor's proposed unrecited requirement that the oxidation reaction must be "maintained" in the pH interval separating 7.0 and 9.0 for the entire duration of the oxidation reaction into the claims, including (i) because the word "maintained" is not recited in the claim (Ex. A at 20:2-7), (ii) the claim is an open-ended "comprising" claim that allows for additional reaction steps (*id*. at 39:2-5), and (iii) because other dependent claims 10 and 21 expressly require pH "control[]" in contrast to claim 1 (*id*. at 47:10-48:16).[1]

B. Patent Specification and Examples – pH is Not Required to be "Maintained" in Claimed Range:

[1] Dr. Myerson testified how the '320 patent treats "controlled" and "maintained" synonymously. (*Id*.)

Second, Dr. Myerson also testified that neither the broader teachings of the specification, nor Example 5 (which uses a specific maltodextrin covered by the claims) requires that pH be "maintained" in the interval separating 7.0 and 9.0. To the contrary, Dr. Myerson explained that the specification (and Example 5) consistently teaches a POSA to maintain the oxidation reaction within the broader pH range of "5.0 to 11.0" and describes "7.0 to 9.0" as the preferred range within the broader "fixed" range:

> Q. In your opinion in this paragraph, you're expressing that the "important to maintain the reaction" applies only to the phrase "between 5.0 and 12.0"; is that right?
> **A. Of course everywhere in the '320 patent, they used the range of some places 5 to 12 but other places 5 to 11, and a preferred range of 7 to 9. So, clearly, the inventors were indicating exactly what they say, important to maintain the pH range between the larger range, with a preferable narrower range. I mean, that's clearly what the inventor is saying throughout the patent.**
> * * *
> Q. All of the examples in the patent -- and you can look at it -- where an oxidation reaction is occurring, that oxidation reaction in the example says, "maintained between 7.0 and 9.0," correct?
> **A. That's incorrect, actually.**
> Q. Which one is different?
> **A. The one we already talked about, the Maltodextrin [Example 5].**

(Ex. A at 90:3-16; 49:1-21; *see also* 49:22-51:19; 90:17-91:2.) In explaining how the patent specification and Example 5 teach to maintain pH during oxidation in the fixed range of 5 to 11 (or 12) (*id*., at, *e.g.*, 24:1-25:2)—and not between 7 to 9—Dr. Myerson also explained multiple times how the other examples merely "exemplify a particular way of practicing the invention" using the preferred range. (*See, e.g., id.* at 92:11-94:16; 97:5-98:17 ("… [t]he specification never says that you must maintain between 7 and 9").)[2]

C. The Scope and Meaning of the Claimed pH Values ("7.0" and "9.0") Should Account for Error Consistent With the Knowledge of a POSA and the Intrinsic Record:

Third, Dr. Myerson also testified that a POSA would understand all pH measurement values have an error/tolerance range, and especially measurements during a chemical reaction involving temperature changes as in the claimed oxidation:

> Q. If some of the oxidation in your opinion can occur outside of 7 to 9, why does 7 need a plus or minus .2 tolerance level?

[2] *See also id.* at 26:6-28:19; 35:6-36:25 ("…. So your position – your side's position in this is that that the entire oxidation has to take place between 7 and 9 with no excursions outside of 7 to 9, which, according -- as I write in my -- one of my declarations, which would indicate if you had a small excursion during the process, it wouldn't infringe the claim. That's not what the claim says, and my opinion is that if you do oxidation between 7 and 9, you infringe the claim. That is the core of what we're discussing. So some of it could be a 10, but some of it has to be between 7 and 9.")

> **A Well, that's a completely different issue. 7 to 9 -- I'm construing the words "7 to 9" -- any physical property measurement has an error in it, irregardless if you put the error values in the number. So 7 has to mean 7 plus or minus something, and using the specification, it appears to me -- and the Marchi declaration -- that the minimum -- the minimum error range in the pH measurement is plus or minus .2. So 7.0 means 7.0 plus or minus .2.**
>
> * * *
>
> Q. If a person of skill in the art -- let me say if persons of ordinary skill in the art always know that there is some level of tolerance with respect to a pH value -- when you measure a pH value --
>
> **A. Yes.**
>
> Q. -- why would the patent specification need to identify tolerance levels for the pH measurements?
>
> **A. Because they are talking here about the tolerance levels during reactions. This is not the tolerance level simply measuring a static pH. And they are informing the POSA, as does the Marchi declaration, what they consider the tolerance levels in measuring pH during a chemical reaction with -- which involves temperature change.**
>
> * * *
>
> Q. In using a pH meter, my pH meter in my lab might have a tolerance level that is different than the pH meter in your lab, correct?
>
> **A. That's possible, but, actually, you're leaving out part of this because it depends on if you're making a static or dynamic measurement, okay. If you're measuring the pH of something that's in equilibrium and not changing, as opposed to this pH measurement, which is quite complicated, you're measuring the pH during a chemical reaction where both the composition is changing, you have a pH controller that is trying to control the pH, and you have temperature changing, all of which -- and you have mixing issues, all of which makes the uncertainty of the pH, irregardless of the calibration, higher.**

(Ex. A at 37:1-13; 108:23-109:14; 75:22-76:14; *see also* 73:23-74:25 (explaining "you always have to take into account uncertainty in any physical property measurement")).[3] Finally, Dr. Myerson also explained why the pH tolerance was not "built into" the claimed range, how the potentially lower tolerances of pH meters used in static lab experiments are not applicable to the claimed invention, and how the word "between" in the claims does not remove tolerances associated with the claimed pH values. (*Id*. at 76:15-78:9; 79:16-80:24; 80:25-83:5.)

II. Deposition of Paul J. Chirik, Ph.D. – "stoichiometric quantities"

A. Dr. Chirik's Construction is Based on the Patent Examples and Stands Unrebutted

At deposition, Dr. Chirik explained "Claim 1 doesn't mention molar ratios" and how Vifor's position improperly "conflate[s] stoichiometric quantity and molar ratio." (Ex. B at 26:3,

[3] Dr. Myerson confirmed at his deposition that both the patent's specification and file history (*e.g.*, the inventor Marchi Declaration) support his opinion that a POSA would interpret the claimed pH values with a +/- 0.2 tolerance. (*See* Ex. A at 108:3-9; *see also, e.g.,* 83:12-25.)

29:18-20.) Dr. Chirik explained how a POSA would look to the patent examples[4] to understand how to determine stoichiometric amounts of hypochlorite based on the sugar at issue:

> Q. Okay. So, in your opinion, the phrase "stoichiometric quantities" in claim 1 doesn't tell a POSA anything about the mole-to-mole ratio for sodium hypochlorite to end aldehydes of the sugars; is that correct?
> **A No, it's not.**
> Q Okay. Then what is correct?
> **A You said it doesn't tell a POSA anything.**
> Q What does it tell a POSA?
> **A It tells a POSA the hypothetical amount you would add to do the oxidation.**
> Q And what is that hypothetical amount?
> **A You calculate based on the number of aldehyde end groups you believe is in the sample and you add an appropriate amount of oxidant. The examples in the patent teach you how to do that.**

(Ex. A at 29:21-30:17; *see also* 24:7-15 (explaining the amount of hypochlorite "depends on what sugar you're trying to oxidize"). Importantly, Dr. Chirik further explained why Vifor's proposed exact 1:1 molar ratio would not apply to dextrins and dextrans (polysaccharides which are the subject of disputed Claim 1):

> Q. Okay. So how would you calculate the number of aldehyde end groups in a sample of a dextrin?
> **A. So the challenge here is that dextrins and dextrans are heterogeneous materials. So they are not monodisperse. So they are not a single chemical entity. And so what you need to do, then, is approximate, using the best data that you have, to figure out how many aldehyde end groups you have. In the case of a dextrin, you would most likely use the DE.**
> Q. How would you calculate the number of end aldehyde groups you believe were in a sample of a dextran?
> **A. Yeah. You would take it based on the average molecular weight. If you had molecular weight information, you would then be able to calculate and estimate how many chain ends you have, and then you would calculate it based on that.**

(Ex. B at 31:15-32:20; *see also* 60:13-61:13 (explaining how dextrose equivalent is not typically used for dextrans because of its structure.) Dr. Chirik explained that any DE value "would have an error associated with it" and would be "your starting point" for determining the appropriate quantity of sodium hypochlorite. (*Id*. at 64:18-65:6.) Materials like maltodextrin are "inherently heterogenous material" and thus "the DE is an approximation" of the molecular weight. (*Id*. at 68:23-69:18; *see also* 70:15-71:3.) A POSA would look to the Examples for guidance on specific sugars which discloses the amounts of reagents used, which teaches a POSA how to execute the

[4] It is undisputed that Vifor calculated the molar ratios of the patent examples and argued to the European Patent Office that "stoichiometric quantities" did not require a 1:1 molar ratio. (*See* DE 67 at 8-10.)

chemistry "[e]xactly how the examples do it." (*Id*. at 98:15-19; *see also* 48:9-49:11; 51:20-52:21; 54:12-56:21.)

Finally, Dr. Chirik further testified about how Vifor's proposed "1:1 molar ratio" construction is specifically inconsistent with the 2:1 molar ratio that is used in Examples 6 and 7. (Ex. B at 81:8-15, 83:1-9, 86:4-88:4 ("As you can see in Example 7, double the moles were used…. [S]toichiometric quantities means …. the amount of reagents you need to get to optimize the product of the reaction."), 89:17-22, 91:10-92:10.)[5] Indeed, in his deposition testimony, Dr. Chirik reiterated his unrebutted opinion that the patent teaches and clearly spells out to a POSA that the stoichiometric quantities used in all of the Examples are not 1:1 ratios. (*Id*. at 100:12-101:21, 134:22-136:19 ("And you can see in my report [DE 66-6 at ¶¶ 9-14] in the table that's provided, that Vifor provided to the EPO, that there's still deviation.) Defendant's counsel studiously avoided asking any follow-up questions of Dr. Chirik at his deposition concerning the unrebutted evidence of Vifor's own calculations of the "stoichiometric quantities" employed in the patent examples, including how they are directly at-odds with Defendant's current proposed construction of a "1:1 molar ratio" because those unrebutted calculations show a 1:1 molar ratio was not used in the patent examples. (*See* DE 66-6 at ¶¶9-14.)[6]

Sincerely yours,

/s/ Jonathan D. Ball

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Shareholder

[5] Dr. Chirik also explained why Vifor's reliance on the Marchi Declaration's reference to "somewhat 'under stoichiometric'" is misplaced. (Ex. B at, *e.g.*, 115:24-119:10, 123:7-126:16.)
[6] Vifor's expert, Dr. Winkler, failed to address Dr. Chirik's opinions based on Vifor's calculations, or the 2:1 molar ratio of Examples 6 and 7.